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ABSTRACT

This document provides information on the integration of assistive computer technologies and library automation systems at California Community Colleges in order to ensure access for students with disabilities. Topics covered include planning, upgrading, purchasing, implementing and using these technologies with library systems. As information management systems have become automated, access to technology has become synonymous with access to information. The need to comply with the Americans with Disabilities Act, by providing access to all individuals, made the integration of "adaptive computing technology" into existing automation systems an attractive solution. The three major types of automation systems are presented and the following automation systems are described: SIRSI, Innovative Interfaces, GEAC, DRA, CARL, Dynix and VTLS. The document also outlines the library access guidelines for persons with disabilities. Examples of types of assistive technologies for library access are categorized by disability, and include screen readers, speech synthesizers, screen enlargers, keyboard modification, and technologies for reading paper text. The document also identifies who at the community college should be responsible for designing and implementing the assistive computer technologies, the relevant decision-making factors to be considered, the characteristics of the users of these services, a rationale for why assistive integration is needed, and relative costs of implementation. (SKF)

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ED 429 636

Providing Access to Library Automation Systems for Students with Disabilities

California Community Colleges
High-Tech Center for the Disabled

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Providing Access to Library Automation Systems for Students with Disabilities

High Tech Center Training Unit
January 1997

As a system, the libraries of California's 107 community colleges comprise one of the largest book collections in the United States. Recent availability of funds for the modernization and expansion of these facilities will introduce new library automation technologies at some locations and upgrade existing systems at others.

Planning for the integration of assistive computer technologies and library automation systems will assure that students with disabilities retain access to this invaluable campus resource. The following pages provide useful information for those involved with planning, upgrading, purchasing, implementing and using assistive computer technologies and library automation systems.

Background

Introduction

For decades, card catalog systems provided the basic tools for searching and retrieving materials from library collections. In the late 1940's, an explosion in the volume of publications, particularly scientific, technical and scholarly writings, began overwhelming the functional limits of information management systems based on words typed, or hand written, on paper cards.

In July, 1945, Dr. Vannevar Bush, Director of the U.S. Government's Office of Scientific Research and Development, wrote a landmark article for The Atlantic Monthly entitle As We May Think. In this article, Dr. Bush recognized the need for radically different systems of information management, theorized the development of personal computers along with a global and cooperative information resource which we know today as the World Wide Web.

Using computers to assist in library information processing began experimentally in the 1960s. In the 1970s most libraries used the computer of the parent body, or a mainframe system over which they had no direct control. The 1970s saw the growth of cooperative services and resource sharing among libraries. In the early 1980s turnkey systems (where one supplier offers complete hardware, software, installation, training and maintenance) became prevalent. The 1990s, have seen the consolidation and acquisition of library information system providers to a core group of perhaps twelve major vendors. This market consolidation reflects advances in library systems and technology, the development of library database standards (Z39.50), the growing dominance of World Wide Web browsers as "front ends" to library databases and the continuously falling costs of client/server computer systems.

It is reasonable to assume that ongoing price drops and the development of increasingly more powerful microcomputers will make microcomputer-based (rather than mini computer systems) the path of choice for many community college library automation systems.

Today, the focus in library automation is on interconnecting systems, information resources, and users. Developments for the future include the growth of the use of networks and the Internet. Inter connectivity of systems is possible, based on Z39.50 standards. The blending of library automation with other information storage/retrieval operations is becoming standard for library automation vendor products. Integrated automated library management systems typically come with modules that include:

circulation (keeping track of books checked out and by whom)

cataloging (keeping and offering access to materials)
acquisitions (acquiring new items)
serials (tracking periodicals)
Online Public Access Catalog or OPAC (automated equivalent of the card catalog
Interlibrary Loan or ILL (cooperative sharing of library materials)

Providing Access for Persons with Disabilities

The American Library Association's "Library Bill of Rights" provides that "books and other information resources should be provided for interest, information, and enlightenment of all the people of the community the library serves." In accordance with this basic policy, libraries historically have undertaken vigorous efforts to provide access to information, collections and materials by implementing classification systems, preservation programs, mediated reference and referrals, interlibrary loan and information literacy programs.

Beginning in the early 1980s, these efforts were expanded tremendously by the development of new information technologies. However, since access to information technology now is synonymous with access to information, libraries must carefully evaluate access to on-line information systems. In seeking to provide access to all users, and to comply with the Americans with Disabilities Act (ADA), libraries can benefit from the integration of "adaptive computing technology" into their on- line information systems and public computer workstations.

The ADA prohibits discrimination against persons with disabilities in the areas of employment, public accommodations, state and local governmental services, transportation, and telecommunications. Pursuant to Title II of the ADA, which became effective on January 26, 1992, any public entity must make its programs, activities and services readily accessible to and usable by persons with disabilities unless doing so would result in a fundamental alteration in the nature of such programs, activities, or services, or would result in undue financial and administrative burdens. Libraries within the California community college system are public entities within the meaning of Title II, and thus, the ADA requires that all programs, services and activities must be readily accessible to persons with disabilities. In this regard, Title II provides certain general guidance for libraries in ensuring compliance, as follows:

- Program access can be provided by, among other methods, reassigning services from inaccessible to accessible locations, providing auxiliary aids (such as note takers, qualified sign language interpreters and readers, taped texts, assistive listening devices, large print, Braille, or ASCII diskette materials), redesigning equipment, modifying policies, altering existing facilities to remove architectural barriers, or constructing new accessible facilities.

The entire Americans with Disability Act can be found at 42 USC Sections 12101 et seq.

For many community colleges struggling with limited budgets, staffing shortages, increasing or declining enrollments, outdated infrastructure and unanswered questions about the scope and direction of computer technology on campus, the issues surrounding access to library automation systems by students with disabilities may often be overlooked when these resources are being reviewed for upgrade or replacement. It is a relatively easy process to plan for and include assistive computer technologies which support library automation systems. These pages are intended to provide guidelines, suggestions, technical information and case studies which clarify and structure the process.

In general, library automation system in the California community colleges now fall into three broad categories:

1. Dedicated host terminals attached to mini-computers running "closed architecture" library automation software.

2. Dedicated host terminals and PCs running terminal emulation software networked to mini or large microcomputers running "closed architecture" library automation software.
3. A mix of PCs (Macintosh, Windows, UNIX) running in a client/server environment utilizing "open architecture" library automation software using a web browser client and World Wide Web and/or Z39.50 configuration operating over local and wide area (Internet) networks.

With few exceptions, items two and three present little difficulty in providing access for students with disabilities. Item one, unfortunately, can only be accessed via dial-up modem.

Library Automation System Providers

Although there are dozens of library automation systems on the Internet, only a handful are widely used by college and university library systems. All of these systems are client/server based, generally employ a WWW browser and are capable of operating across the Internet. Additionally, most support Z39.50 protocol and are able to operate via a simple telnet connection as well.

These vendor supplied profiles represent a sampling of providers and the various interface design possibilities represented by their products. Where possible, links to product demonstration pages as well as to live sites at college campuses. have been provided Exploring these links using one or more of the assistive computer technologies discussed in these pages provides an excellent way to evaluating some accessibility aspects of the various products.

SIRSI

Founded in 1979 as a technical consultancy in library automation and information management, the Huntsville, Alabama, company has become the recognized leader in the development of UNIX-based integrated library automation systems.

The company has consistently pushed the boundaries of information automation, combining the technical expertise of mathematicians and computer scientists with librarians' understanding of information delivery and control.

In 1982, SIRSI created the first UNIX-based client/server networked library system, and the company has pioneered the use of networks and client/server architecture in information handling ever since.

Today, SIRSI's systems serve hundreds of libraries and information centers, with databases from a few thousand to millions of titles. Their integrated library system networks are installed in academic, public, K-12, law, medical, government, and corporate libraries around the world.

With the rapid expansion of international networking such as the Internet, SIRSI is expanding its product line to the desktop, to help individuals organize and find information on the "information highway." A demonstration site is also available for product evaluation.

Innovative Interfaces

Innovative Interfaces provides computer software and hardware for the automation of the various functions performed by college, university, public and special libraries. Approximately 600 major libraries world-wide use Innovative's UNIX-based INNOPAC system.

GEAC

Geac is a leading supplier of UNIX based library automation systems for public, academic, and special libraries. We have been providing products and services to improve the efficiency of library operations for 25 years, longer than any other library automation vendor.

The cornerstone of our business is automating the standard library functions such as circulation, public access catalog, acquisitions, and serials control. Libraries throughout the world are taking advantage of Geac's functionally-rich second generation products - ADVANCE and PLUS. These truly open systems are built on the foundation of our first generation proprietary systems - GLIS and LIBS 100. Additionally, in Europe, Geac markets the Vubis library automation system. Geac is the only library automation vendor that has successfully migrated a large portion of our customer base from first generation proprietary systems to open systems.

DRA

DRA is a leading provider of client/server automation systems, networking services and other related services, with our primary systems emphasis focusing on libraries and other information providers.

With more than 10 years' experience connecting major institutions to the Internet and a proprietary backbone that includes redundant T-3 connections to Internet interconnect points, our services also include dedicated Network Service Provision for corporations and institutions. Take a look at sites using DRA library software.

CARL

The CARL System is a turnkey library management system designed to serve large, networked libraries in county, regional or cooperative settings.

Over 450 libraries are currently supported on the CARL System, which is comprised of 32 interconnected CPU locations that link over 14,000 dedicated terminals from Hawaii to Boston.

The CARL System serves major urban library systems across the United States, including those in Denver, Los Angeles, Chicago, Baltimore County, Houston, Ft. Lauderdale, Atlanta, Montgomery County and San Antonio.

Dynix

Dynix is the most robust library automation library system in the market today. It offers full-featured modules for library staff and their patrons. Dynix provides both character-based access and graphical-user interface modules as well as new Client/Server components. All modules are integrated so that data updated in one module is reflected in all modules. Dynix systems are installed at college and university sites across the United States.

VTLS

VTLS Inc. develops, markets, and supports solutions for managing library collections and accessing information via computer networks. Our solutions include software and services for Internet and World Wide Web connectivity, imaging, retrospective conversions, data conversions and loading, and library profiling. Our customers are information centers around the world. This year, in celebration of our 10th anniversary as a for-profit company, VTLS is introducing Virtua--next generation software for distributed, multimedia environments. A selection of libraries using VTLS systems are available for review.

Library Access Guidelines

Library access guidelines for persons with disabilities have been under consideration by international, national, state and local organizations for many years. After the United Nations Decade of Disabled Persons, in late 1993, the UN General Conference approved the United Nations Standard Rules on the Equalization for Opportunities of Persons with Disabilities which refers to the role of libraries among other cultural and educational organizations.

The following are the most important parts of the Rules related to information provision for persons with disabilities.

> Rule 5: Access to information and communication. The primary responsibility of the state government is confirmed in this rule. Availability of access to "computerized information and service system" is demanded in this rule.
>
> Rule 6: States should develop strategies to make information services and documentation accessible for different groups of persons with disabilities. Braille, tape services, large print and other appropriate technologies should be used to provide access to written information and documentation for persons with visual impairments...
>
> Rule 10: States should ensure that new computerized information and service systems offered to the general public are either made initially accessible or are adapted to be made accessible to persons with disabilities.
>
> Rule 11: Organizations of persons with disabilities should be consulted when measures to make information services accessible are being developed.

Libraries are identified in Rule 10 as follows:

States will ensure that persons with disabilities are integrated into and can participate in cultural activities on an equal basis.

> t 1. States should ensure that persons with disabilities have the opportunity to utilize their creative, artistic and intellectual potential, not only for their own benefit, but also for the enrichment of their community, be they in urban or rural areas. Examples of such activities are dance, music, literature, theater, plastic arts, painting and sculpture. Particularly in developing countries, emphasis should be placed on traditional and contemporary art forms, such as puppetry, recitation and story-telling.
> t 2. States should promote the accessibility to and availability of places for cultural performances and services, such as theaters, museums, cinemas and libraries, to persons with disabilities.

In addition to findings and directives by international bodies on the subject of library access for persons with disabilities, nationally, the Americans with Disabilities Act (ADA) speaks directly to the responsibilities of public entities in this regard.

The ADA prohibits discrimination against persons with disabilities in the areas of employment, public accommodations, state and local governmental services, transportation, and telecommunications. Pursuant to Title II of the ADA, which became effective on January 26, 1992, any public entity must make its programs, activities and services readily accessible to and usable by persons with disabilities unless doing so would result in a fundamental alteration in the nature of such programs, activities, or services, or would result in undue financial and

administrative burdens. Libraries are public entities within the meaning of Title II, and thus, the ADA requires that all programs, services and activities must be readily accessible to persons with disabilities. In this regard, Title II provides certain general guidance for libraries in ensuring compliance, as follows:

> Program access can be provided by, among other methods, reassigning services from inaccessible to accessible locations, providing auxiliary aids (such as note takers, qualified sign language interpreters and readers, taped texts, assistive listening devices, large print, Braille, or ASCII diskette materials), redesigning equipment, modifying policies, altering existing facilities to remove architectural barriers, or constructing new accessible facilities. In order to ensure adequate communications with persons who have hearing, vision or speech impairments, a library may supply assistive listening systems, television and video captioning, telecommunication devices for the deaf (TDD), Braille, large print, etc. All special programs, social events, readings, lectures or similar events (e.g., exhibits) must be held in architecturally accessible locations.

In compliance with these guidelines, the majority of California universities, state and community colleges have implemented, or are planning implementation guidelines to provide enhanced library access for students with disabilities. The library access guidelines policy at UCLA offers a good example.

On a more "nuts and bolts" level, the web has a growing collection of articles which deal with matters such as Alan Cantor's observation that:

> "On the road to making libraries more accessible to people with disabilities, librarians often get stuck in technological mud. The choices are overwhelming, and many librarians feel they lack the technical expertise to select appropriate equipment. "

Still other libraries have begun to address the need for diversity and technology training as a part of improving library access for students with disabilities. A recent paper by Marilyn Graubart, Business Reference Librarian at the University of Missouri-Kansas City Miller Nichols Library provides a worthwhile example:

> "In the spring of 1993, two librarians in the Miller Nichols Library Reference Department received a "diversity grant" for $10,000 from the campus to offer additional library services to UMKC patrons with special needs. This included international students, persons with disabilities, and racial and ethnic minority students. The grant had three objectives: (1) to improve the ability of students to conduct library research independently by expanding the library instruction program to better serve the needs of persons with physical disabilities, international students, and racial and ethnic minorities; (2) to improve library services by increasing the sensitivity and understanding of the library staff toward persons with physical disabilities, international students, and racial and ethnic minorities; and (3) to improve access to information and to enhance the library's collection to better serve persons with physical disabilities."

At the center of every effort to enhance library access for students with disabilities lies the need to provide effective access to electronic resources for patrons with disabilities. Although the pages on this web site attempt to address that process in a manner specific to the needs of California community colleges, a vast amount of more general information is available on the web. A particularly rich location for such material can be found at the EASI web site Libraries Without Walls. Other useful sites include:

NCSA Mosaic Access Page
National Center for Accessible Media (NCAM) Disability Links
Microsoft Accessibility Site

WebAble
DRAFT STANDARDS ON LIBRARY SERVICES FOR PEOPLE WITH DISABILITIES
National Library Service for the Blind and Physically Handicapped
Home Pages of Network Libraries
ACT Disability Resources

Assistive Technologies for Library Access

Computer hardware/software assistive technologies which make information in libraries easily accessible to persons with disabilities are now readily available. The transition of library card catalogs from paper to electronic media along with the increasing availability of journals and magazines in electronic format, has significantly increased the independence of persons with disabilities to access these sources of information.

Although "dumb" display terminals connected directly to mainframe computers cannot support assistive technologies, Windows, Macintosh and other "personal computers" connected to the library's computer network can. The assistive technologies described below are designed for use with personal computers. Platform-specific examples of products are listed. Although many other access products are available, those described here are widely used in California community college High Tech Centers and are supported by the High Tech Center Training Unit.

Types of Assistive Technology

There are several basic types of assistive technologies useful for persons with disabilities. Some are required for on-line catalog and Internet access while others are used for access to information printed on paper.

Assistive Technologies For On-line Catalog Access, Internet Access, and Computer Use:

For Persons Who Are Blind or Have Learning Disabilities

Screen Readers

A screen reader is a software program which converts information displayed on screen to information processed by a speech synthesizer which converts it to speech. The user listens through headphones.

In a library setting, a screen reader must be able to read and navigate through the card catalog screen displays: it must be able to read a single field or an entire record as well as read lines, words, or single letters. Screen readers can, and should, be customized to effectively work with the library automation system's screen displays. Screen navigation and reading of screen content are accomplished through keyboard commands. Most screen readers come pre configured for use with most popular Web browsers and major applications.

Examples

For Windows
JAWS Training Guide (Job Access With Speech) for Windows
Software developer: Henter-Joyce

For Macintosh
outSpoken Training Guide
Software developer: ALVA

Speech Synthesizers

A screen reading program requires a speech synthesizer, the device which actually speaks the information from the screen. A speech synthesizer can be an internal (a card) or external device. Macintosh computers come with built-in capacity for speech synthesis. Windows based computers (3.1 and 95) require the addition of an internal or external speech synthesizer. Although it is possible to use a sound card (such as SoundBlaster with Text Assist) as a speech synthesizer, other multimedia sound functions are disabled when the sound card is used in this way.

Examples

For Windows

External
DECtalk Express by Digital Equipment Corporation

Internal
DECtalk PC by Digital Equipment Corporation

Sound Card
Sound Blaster (must support Text Assist utility) by Creative Labs

For Persons with Low Vision

Screen Enlargers

The purpose of a screen enlarger is to increase the size of text and/or graphics which appear on the screen of a computer display monitor. This type of software application must be able to increase magnification from 2X to perhaps 8X levels; the application must also support panning around the entire screen contents, usually most simply done by mouse movement. These devices allow the user to modify contrast, reverse contrast and modification of foreground and background color, if desired. Such systems should also have the capacity to enlarge pictures as well as text, if they are included in the library system. This type of program is generally software based and runs "in the background" where it can easily be turned on and off.

Examples

For Windows
ZoomText 5.1 Training Guide
Software developer: AI Squared

For Macintosh
CloseView Training Guide

Software developer: Apple

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For Persons With Physical Disabilities

Keyboard Modification

Necessary for persons who cannot use the keyboard in a standard fashion.

For persons whose disabilities make it difficult to use a standard keyboard, keyboard modification software is required. Windows 95 Accessibility Options and the Macintosh Easy Access are built into the operating systems; they can be found in the Control Panels. For the Windows 3.1 environment there are third party products or a free downloadable Access Pack from Microsoft. All keyboard modification software should support key latching, stop automatic key repeat, and provide keyboard commands for mouse-driven activities. A trackball mouse can be used by some persons unable to use a conventional mouse.

Technologies Required For Reading Paper Text

For Blind and Learning Disabled

Optical Pattern Recognition (OPR) Scanning Reading Systems allow the user to scan text and convert it to speech. Persons who are unable to see or decode the text can "read" by ear. There are two types of OPR systems: freestanding scanning systems and those connected to a computer which displays scanned text on screen and/or saves it to disk. In a library setting, OPR systems allow the user to easily read most magazines, books, or research material.

Freestanding systems can be used very simply and require a minimum amount of learning; read/scan systems connected to a computer and monitor require a speech synthesizer and some technical ability on the part of the user.

Examples:

Freestanding Scanning System
Reading Edge Training Guide
Software developer: Xerox

Computer-Connected Scanning Reading System

For Windows
Open Book Unbound Training Guide
Software developer: Arkenstone

BookWise Training Guide (designed for persons with learning disabilities)
Software developer: Xerox

For Persons with Low Vision

Closed Circuit TV (CCTV)

A CCTV (a large monitor with a built-in television camera for viewing pages) allows a user to place a book or magazine underneath the monitor and have the page contents instantly magnified on the screen. Almost all systems now support color monitors.

> A CCTV provides the ability to magnify anything which can be placed under its camera: in a library setting it most usually will be pages from a book, magazine or newspaper. Whatever is to be magnified is placed on movable platform beneath the monitor and camera so that the user can pan around and freely examine all portions of the material. These devices allow the user to modify contrast, reverse contrast and change foreground and background color, if desired. No technical skill is required to use a CCTV.
>
> Example

Chroma CCD by Telesensory Corporation

Instructional Materials

Simplified instructions for using assistive technologies should be placed by each accessible computer. These instructions, as well as instructions for using the library automation software or the Internet should be provided in a variety of formats:

For Blind:

- Cassette Tape
- Braille
- Text File

For Low Vision:

- Large Print
- Cassette Tape
- Text File

For Learning Disabled:

- Cassette Tape

Resources for Braille Materials

> Braille documents can be produced from computer text files using Braille translation software and a Braille printer. Alternately, material can be scanned into a text file and then exported to a Braille translator. Braille printers are significantly noisier than dot matrix or laser printers. They should be placed in a sound-proof enclosure where library patrons will not be disturbed.

Examples:

VersaPoint Braille Embosser
by Telesensory Corporation
MegaDots Braille Translation Software by Raised Dot Computing

About Speech Recognition Software

Although useful for some persons with physical disability who are unable to use a keyboard, it is currently felt that the technical requirements of this type of software application limit its effective use in public settings such as libraries.

Planning for Library Access

Planning for the purchase, installation of technology and the training and support of the people needed to provide access to an existing, upgraded or new library automation system might start by seeking answers to the following questions:

Who
Wants what
For whom
Why
And for how much

Who

Designing and implementing an effective and manageable array of assistive computer technologies in support of library automation requires the cooperation and involvement of many campus departments and individuals. These might typically include: the Vice President(s) of Instruction and/or Student Services, Head Librarian, Library Automation Specialist, Network Administrator, Campus Computer Services Manager, Library Automation System Vendor(s), DSP&S Program Director, High Tech Center Specialist, the campus ADA Coordinator and representative students with disabilities. Each of these individuals and their constituencies has an important role to play.

It is often the role of the college President or Vice Presidents to provide institutional guidance and direction with regard to policies concerning campus wide access issues. Since the assistive technologies needed to provide access to new or existing library automation systems may come with a cost beyond the capacity of any one department to shoulder without incurring undue programmatic or fiscal hardship, it may fall to the highest levels of college administration to determine first that the access must be provided and second, where the funding will be found.

The Head Librarian and Library Automation Specialist will be able to provide essential information about the existing library automation system and how it operates. Is it a dedicated system which can only be accessed via "dumb" terminals, will it work with Windows, DOS or Macintosh computers, is it a text based or graphically oriented system, does the library automation system "take over" the client computer or can other programs still operate. Additionally, if the college is in the process of planning an upgrade to, or replacement of, its existing library systems, the Head Librarian and Library Automation Specialist will be able to provide invaluable information about the systems they are considering, the types of client/server configurations being evaluated and their implications concerning access by students with disabilities.

The Network Administrator and Campus Computer Services Manager will be able to provide

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input about cost, installation, networking, configuration and maintenance of the basic microcomputers located in the library which access the library database. Additionally, these specialists can provide useful information about the feasibility of mounting certain pieces of assistive computer software on the library computer network and of configuring computers to automatically load a preset software package when a particular student logs on.

If the college has selected one or more vendors as likely providers of a library automation system for the campus, it is essential that the vendor(s) be actively involved in demonstrating the capacity of their product to support access to assistive computer technologies. Since the college and library have a clearly defined mandate under ADA to provide access to such systems, the college may wish to consider the vendor's ability to successfully demonstrate the use of basic access tools for blind, low vision and physically disable students with their systems as a precondition of sale.

The role of the DSP&S Director includes, as always, advocacy on behalf of students with disabilities. In addition to that role, the Director may also be called upon to consider funding part, or all, of the project through DSP&S funds, provide training and support resources for the library and computer support staff who will need to understand basic use of the assistive technologies to be installed, work with the campus ADA coordinator to identify alternate funding sources and generally facilitate the process. The High Tech Center Specialist may provide background information about the specific types of assistive technologies available, evaluate the functionality of access tools with existing or proposed library automation systems, assist with the installation of access technologies, provide basic training to library and computer support staff, comprehensive training to students who will be using the systems and, occasionally, on-site student support.

Just as the Network Administrator and Campus Computer Services Manager provide technical input as to hardware/software requirements and network capabilities, so too will the ADA Coordinator provide technical input and counsel as to the colleges legal responsibilities and scope of the access technologies required versus desired.

Students with disabilities, as the actual users of both library automation and assistive technologies, will offer strong an important opinions as to the types of assistive technologies which ought to be available (i.e. screen readers, large print systems, keyboard adaptations, etc.) as well as direction about the library resources with which they would like to use access technologies (i.e. card catalog, CD collections, World Wide Web). The college will want to listen carefully to the voices of students who are knowledgeable and experienced users of the assistive computer technologies which will be used to provide access to the library automation system.

Wants What

Although the content may vary somewhat from college to college, the following lists display many of the areas in which various constituency groups are likely to be invested. It is essential that the values, needs and requirements of these groups be carefully considered when implementing assistive computer technologies. Although the general guidelines of ADA, as well as most campus policies regarding student inclusion, strongly support providing access wherever possible, the language of the ADA also recognizes the need for compromise in situations where providing certain types of access accommodations "would result in a fundamental alteration in the nature of such programs, activities, or services, or would result in undue financial and administrative burdens."

College Administration

Best possible learning
environment for students
An operational library
Cooperation between

programs/departments
Cost effective solutions
Good relationships with students, community, faculty, board and over site agencies

Head Librarian
Library Automation Specialist

Best possible learning environment for students
A well managed library
Smoothly functioning library automation system
Stable hardware/software system
Cost effective solutions
Minimal (or no) new demands for additional staff time to support access technology
Minimal or no impact on library budget

Network Administrator
Computer Services

Network security remains intact
Software compatibility with existing systems
Easy installation
Low maintenance requirements
Training provided to staff
Requires minimum day-today support
Budget for upgrade/repair costs

Vendor(s)

Good customer relations
Little or no modification of software package
Minimum time spent evaluating access issues
Minimum investment of company time/resources in correcting access problems

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DSP&S Director
High Tech Center Specialist

- Best possible education environment for students
- Student access to library resources
- Cooperation of library staff and other participating groups
- Cost effective solutions
- Minimal impact on DSP&S budget
- Minimal impact on HTC training resources
- Good relationships with students, community, faculty, board and over site agencies

ADA Coordinator

- Best possible educational environment for students
- Provide reasonable accommodation
- Avoid undue hardship for programs, departments, college, district
- Cost effective solutions
- Maintain good relationships with students, community, faculty, board and over site agencies

Students

- Equal access to library resources for blind, low vision, learning disabled, physically disabled, deaf and hard-of-hearing students
- College provides training in the use of access tools available in the library
- A reasonable number of accessible work stations
- Accessible stations maintained in working order
- Basic support available through library staff

Although each of these groups generally is committed to providing students with the best possible learning environment, working cooperatively, finding cost effective solutions and offering reliable and effective technologies, several important questions will need to be answered:

- who decides what's needed
- who pays for it

who installs the hardware/software
who trains the students
who trains the staff
who provides on-site student support
who repairs the hardware/software
who pays for repairs
who pays for hardware/software upgrades

For Whom

Understanding the demographics of the population of students with disabilities who will be using the library is an important step in the process. About 10% to 15% of California community college students have a significant disability. Within that group, the largest segment is made up of students with learning disabilities, next are students with physical disabilities, followed by students with visual disabilities, students who are deaf or hard-of-hearing and students with psychological disabilities.

Since the cost of providing access varies from virtually nothing for many physically disabled, deaf or hard-of-hearing and psychologically disabled students to hundreds or thousands of dollars for students with learning or visual disabilities, it is essential to understand the makeup of the group to be served.

In general, the access tools for blind and low vision students will account for the largest percentage of the project, require the greatest amount of training and support and the highest amount of maintenance. Fortunately, these same tools can also support students with learning disabilities as well as elderly students and students who speak English as a second language.

Why

The college library is the heart of the institution. Increasingly, libraries are becoming interconnected electronic gateways to the constantly expanding global database represented by the World Wide Web. Students who cannot access these resources are at a critical disadvantage both academically and professionally. Although many of the reasons college's wish to provide access to library resources for students with disabilities seem obvious:

a desire to provide the best possible learning environment for all students
a campus culture of reaching out to under represented groups
a commitment to equal access

other motivating factors may be more subtle. It is sometimes the case that covert factors influence the process in both positive and negative ways. Some of these factors might include:

strong advocacy from one or more participants
political pressure from community advocacy groups
confusion about what's desired versus what's required
media attention
concerns about intervention by Office of Civil Rights
pressure to conform to external, unfunded mandates

Under these conditions, groups may sometimes over respond by providing more technology than

is needed or can be supported or under respond by providing the minimal amount of technology necessary to avoid potential legal liability.

The end result of the process is to provide the basic access tools necessary to allow students with disabilities to do what any other student using the library might do: look up books and reference materials in the electronic card catalog, research class assignments, read books and periodicals. The objective is to accomplish this goal as cost effectively as possible using well understood, reliable assistive technologies in a simple and straightforward manner which minimizes the need for student/staff training and requires the smallest possible amount of support.

For How Much

The twin questions of "How much is it going to cost?" and "Who's going to pay for it?" are almost always hotly contested matters in any campus project requiring capital outlay. In many cases, these issues will also arise around purchasing assistive technologies to support the library automation system.

The overall cost of making library workstations accessible will vary with the needs of the population to be served. In addition to direct hardware/software costs, there are also the less obvious, but very real, costs in staffing time for installation, training and support as well as ongoing costs for equipment maintenance and hardware/software upgrades.

In very round numbers, the average cost of equipping a 486 or Pentium PC running Windows 3.x, Windows 95 or DOS to provide basic access to the library card catalog and other online resources for blind, low vision, physically disabled, learning disabled, deaf, hard-of-hearing and psychologically disabled students is about $2500.00. The average cost of a Pentium based computer equipped for network access with at least a one gigabyte hard drive, 32 megabytes of RAM , CD ROM drive, Sound Blaster board and ethernet card is about $2200.00. A much more detailed breakdown of these devices is provided under Library Access Tools.

The question of "Who going to pay for it?" can easily lead into a morass of confusing and conflicting conversations which can stall the momentum of the project.

Points brought forward may include:

it's an issue involving access for students with disabilities, the DSP&S program takes care of that, DSP&S should pay for the technology
the computers are in the library, the library should pay for access technology
the college has a responsibility to make itself accessible to students with disabilities, neither the library or DSP&S is asked to pay for ramps, automatic doors or accessible restrooms,
the college should pay for library access out of the general fund
the district office should pay for library access technology
the Chancellor's Office should pay for library access technology

Although there are no simple answers to the question of "Who's going to pay for it?", thoughtful planning for replacing or upgrading library automation systems or building a new campus library may make the question unnecessary. When requesting funds from the college district or Chancellor's Office for library automation hardware/software, simply include the cost of assistive technology in the overall project budget. During the planning and budgetary process for proposing State funding for a new campus library, include the cost of assistive technology in the overall proposal. Alternately, your college may wish to consider setting aside 10% to 15% of capital equipment funds earmarked for the purchase of computers to be used for the purchase of assistive

computer technologies.

In many cases, the best approach may be to introduce library access as a staged process in which the costs are distributed through a number of budgetary sources and accessible workstations are introduced in small numbers over an agreed upon period of time.

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